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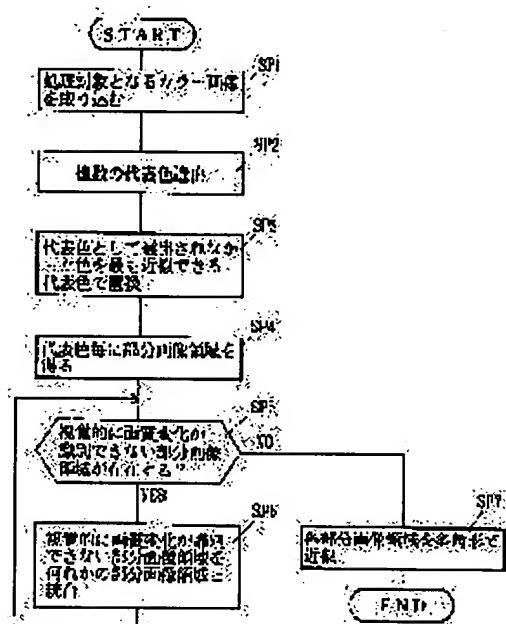
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## (54) COLOR IMAGE PROCESSING METHOD/DEVICE

### (57)Abstract:

**PURPOSE:** To prevent the generation of the useless areas by integrating a relevant area with its adjacent area in response to a decided fact that the change of the picture quality cannot be visually recognized basing on the size of the area and the color difference between the area and its adjacent area.

**CONSTITUTION:** The color image to be processed is fetched (SP1) and plural representative colors (having higher appearing frequency in a color image) are selected (SP2). The color which is not selected as a key color is replaced with a representative color having the highest approximation (SP3). Then, a partial image area is obtained at every representative color (SP4). Then, it is discriminated whether a partial image area where the change of the picture quality cannot be visually identified is existed or not (SP5). If so, the relevant partial image area where the change of picture quality cannot be visually recognized is integrated with another partial image area (SP6). Then, the preceding discrimination is carried out again. If it is discriminated that the partial image is not existed, each partial image area is approximated with a polygon.



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**CLAIMS**

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**[Claim(s)]**

[Claim 1] Based on a color picture, select the representation color of a predetermined number, and a color picture is divided into two or more fields based on the selected representation color. The color picture art characterized by unifying with an adjoining field the field which answers and corresponds to having been distinguished when it could not distinguish whether image quality change could be visually recognized based on the size of the field obtained as a result of division, and the color difference with an adjoining field and image quality change had not been recognized visually.

[Claim 2] A representation color selection means to select the representation color of a predetermined number based on a color picture (2), A field division means to divide a color picture into two or more fields based on the selected representation color (4), A field distinction means to distinguish whether image quality change can be visually recognized based on the size of the field obtained as a result of division, and the color difference with an adjoining field (5), The color picture processor characterized by including a field integrated means (6) to unify with an adjoining field the field which answers and corresponds to the distinction result of the field distinction means (5) which shows that image quality change cannot be recognized visually.

[Claim 3] Based on a color picture, select the representation color of a predetermined number, and a color picture is divided into two or more fields based on the selected representation color. It answers that the pixel field where belonging to the boundary section of comparatively large fields to one field is permitted as a result of division exists. The color picture art characterized by unifying the pixel field which corresponds based on extensive \*\* of the comparatively large fields in the predetermined range to which a comparatively large field.

[Claim 4] A representation color selection means to select the representation color of a predetermined number based on a color picture (2), (The field division means (4) and (5) which divide a color picture into two or more fields based on the selected representation color, and 6), A pixel field distinction means (14) to distinguish whether the pixel field where belonging to the boundary section of comparatively large fields to one field is permitted as a result of division exists, and (15), The distinction result of the pixel field distinction means (14) which shows that the above-mentioned pixel field exists, and (15) is answered. The color picture processor characterized by including a pixel field integrated means (16) to unify the pixel field which corresponds based on extensive \*\* of the comparatively large fields in the predetermined range to which a comparatively large field, and (17).

[Claim 5] The color picture art which selects the representation color of a predetermined number based on a color picture, and is characterized by the color difference unifying the long and slender field which divides a color picture into two or more fields based on the selected representation color, answers that a long and slender field exists in the boundary section of comparatively large fields as a result of division, and corresponds based on the color difference of the corresponding long and slender field and a comparatively large field to a small field.

[Claim 6] A representation color selection means to select the representation color of a predetermined number based on a color picture (2), (The field division means (4) and (5) which divide a color picture into two or more fields based on the selected representation color, and 6), A Sai chief field distinction means to distinguish whether a long and slender field exists in the boundary section of comparatively large fields as a result of division (21), The distinction result of the Sai chief field distinction means (21) which shows that a long and slender field exists is answered. the above -- The color picture processor characterized by including a Sai chief field integrated means (22) by which the color difference unifies the long and slender field which corresponds based on the color difference of the corresponding long and slender field and a comparatively large field to a small field, and (23).

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Industrial Application]** This invention relates to the suitable color picture art for compression processing of a color picture, and its equipment about a color picture art and its equipment.

**[0002]**

**[Description of the Prior Art]** It follows on progress of an image processing technique in recent years, and the spread of the mass are recording media represented by the optical disk, and research of the image retrieval using the image database with which the image database was created and created is advanced. By the way, generally, since a color picture has much amount of data remarkably, if it remains as it is and being put in a database, even if it uses a mass are recording medium, the data transfer duration in the case of performing image retrieval cannot become remarkably long, and it not only cannot accumulate a sufficient number of color pictures, but it cannot build a practical image retrieval system at all.

**[0003]** Since the amount of data of a color picture is reduced sharply and a practical image retrieval system is obtained in consideration of such a point, compression of a color picture and an expanding technique are studied and the field division technique of the color picture which has quite big effect on compressibility also in it is studied. Moreover, when applying to an image recognition system, the field division technique of a color picture is studied on the relation which has big effect on image recognition precision etc.

**[0004]** The field division approach of the above-mentioned color picture is an approach of dividing a color picture into a partial image with the local uniform description, and brightness, a color, etc. are adopted as a local description, for example. By representing the field specifically approximated to the description value from which the frequency of occurrence chose and chose two or more high description values into the original color picture with the corresponding description value It is the approach of creating the field for every description value, and the original color picture can be divided into subregion based on the description value of comparatively few classes. Since the description value which corresponds to each divided field is only assigned Since the field which has a description value which the amount of data of a color picture can be lessened remarkable as a whole, and is different in \*\* shows a body which is different in \*\*, it can attain image recognition with a simply and sufficient precision based on a field division result.

**[0005]** Moreover, the shade level of the pixel which looks for the pixel which carries out the raster scan of the image and belongs to neither of the fields, and corresponds, When a difference with the shade level of the pixel which still belongs to neither of the fields in the near is below a predetermined threshold, it unifies as one field. The value of the simple field dilation and the pixel for every field which are repeated until it performs the above-mentioned processing paying attention to the pixel newly integrated and it becomes impossible for a field to extend these processings any more is permuted by the average in a field. The repetitive mold field dilation (see the 689-690th pages of the image-analysis handbook of the University of Tokyo Press issue on January 17, 1991) which added the point to which a threshold is made to increase to the simple field dilation is proposed. If these approaches are adopted, unify a pixel one by one a condition [ the difference of the shade level of pixels or the difference of the shade level of a pixel and the average shade level of a field being below a threshold ], can extend a field, it is made to correspond to a threshold, and an image can be divided into two or more fields.

**[0006]**

**[Problem(s) to be Solved by the Invention]** However, since the original color picture is considerably overlapped on the random noise resulting from the variation in the sensor for incorporating a color picture etc. and such a random noise may be greatly different from the brightness of the perimeter, a color, etc. widely, when it is going to divide the range to approximate as a partial image field, the same as that of the selected description value or possibility of being left

behind as it is quite high [ a random-noise part ]. Consequently, the detailed field of a large number which originate in random noise etc. other than the comparatively big field based on the selected description value will be formed. Consequently, it not only can seldom shorten the processing time as the whole color picture (as compared with the case where there is no random noise etc., the processing time becomes remarkably long), but a result not much good as the color picture compression processing result as after treatment of field division and a color picture recognition result is no longer obtained.

[0007] Moreover, when the long and slender field where the description value differs from any field in the boundary section of the divided subregions when the original color picture is \*\*\*\*ing out of the focus will be generated and random noise etc. is overlapped on {refer to drawing 10 (A)} and the boundary section of the partial images divided further, the boundary of the divided subregions will become tooth-like {refer to drawing 10 (B)}. Although giving filtering which emphasizes an edge to such a color picture is proposed, since it will originate in filtering and overshoot and undershooting will occur into an edge part, new un-arranging [ that overshoot and undershooting will affect a color picture compression processing result and a color picture recognition processing result ] is generated.

[0008] Furthermore, in order to remove the ghost who arose in the boundary section of partial images, the pattern of the image which may happen is memorized beforehand and the method of removing a ghost based on the memorized pattern is proposed (refer to JP,4-22069,B). However, if this approach is adopted, since it memorizes for example, when there is much color number, and it puts, it comes and combines, the number of patterns increases remarkably and these combination [ all ] patterns must be memorized, memory space will increase remarkably. Moreover, if the number of combination patterns increases remarkably, long duration will start remarkably collating with a processing-object color picture and a storage pattern, and a processing duration will become remarkably long as a whole.

[0009]

[Objects of the Invention] This invention is made in view of the above-mentioned trouble, and it aims at offering the color picture art which can attain field division of a color picture where generating of the unnecessary field resulting from random noise, pin dotage, etc. is prevented certainly, and its equipment.

[0010]

[Means for Solving the Problem] The color picture art of claim 1 for attaining the above-mentioned purpose Based on a color picture, select the representation color of a predetermined number, and a color picture is divided into two or more fields based on the selected representation color. It is the approach of unifying with an adjoining field the field which answers and corresponds to having been distinguished when it could not distinguish whether image quality change could be visually recognized based on the size of the field obtained as a result of division, and the color difference with an adjoining field and image quality change had not been recognized visually.

[0011] A representation color selection means by which the color picture processor of claim 2 selects the representation color of a predetermined number based on a color picture, A field division means to divide a color picture into two or more fields based on the selected representation color, A field distinction means to distinguish whether image quality change can be visually recognized based on the size of the field obtained as a result of division, and the color difference with an adjoining field, A field integrated means to unify with an adjoining field the field which answers and corresponds to the distinction result of the field distinction means which shows that image quality change cannot be recognized visually is included.

[0012] The color picture art of claim 3 selects the representation color of a predetermined number based on a color picture. Based on the selected representation color, divide a color picture into two or more fields, and it answers that the pixel field where belonging to the boundary section of comparatively large fields to one field is permitted as a result of division exists. It is the approach of unifying the pixel field which corresponds based on extensive \*\* of the comparatively large fields in the predetermined range to which a comparatively large field.

[0013] A representation color selection means by which the color picture processor of claim 4 selects the representation color of a predetermined number based on a color picture, A field division means to divide a color picture into two or more fields based on the selected representation color, A pixel field distinction means to distinguish whether the pixel field where belonging to the boundary section of comparatively large fields to one field is permitted as a result of division exists, The distinction result of the pixel field distinction means which shows that the above-mentioned pixel field exists is answered, and a pixel field integrated means to unify the pixel field which corresponds based on extensive \*\* of the comparatively large fields in the predetermined range to which a comparatively large field is included.

[0014] The color picture art of claim 5 is the approach of selecting the representation color of a predetermined number based on a color picture, and unifying the long and slender field which divides a color picture into two or more fields based on the selected representation color, answers that a long and slender field exists in the boundary section of

comparatively large fields as a result of division, and corresponds based on the color difference of the corresponding long and slender field and a comparatively large field to which a comparatively large field.

[0015] A representation color selection means by which the color picture processor of claim 6 selects the representation color of a predetermined number based on a color picture, A field division means to divide a color picture into two or more fields based on the selected representation color, A Sai chief field distinction means to distinguish whether a long and slender field exists in the boundary section of comparatively large fields as a result of division, the above -- a Sai chief field integrated means to unify the long and slender field which answers the distinction result of the Sai chief field distinction means which shows that a long and slender field exists, and corresponds based on the color difference of the corresponding long and slender field and a comparatively large field to which a comparatively large field is included.

[0016]

[Function] If it is the color picture art of claim 1, the representation color of a predetermined number will be selected based on a color picture. The size of the field which divided the color picture into two or more fields based on the selected representation color, and was obtained as a result of division, It distinguishes whether based on the color difference with an adjoining field, image quality change can be recognized visually. Since the field which answers and corresponds to having been distinguished when image quality change had not been recognized visually is unified with an adjoining field, the thing resulting from random noise etc. which the field which cannot recognize image quality change remains independently visually can be prevented certainly, and it can divide into the subregion of a necessary minimum number. Moreover, since the field which cannot recognize image quality change is unified visually, there is no un-arranging [ that originate in field integration and image quality deteriorates ].

[0017] If it is the color picture processor of claim 2, based on a color picture, the representation color of a predetermined number will be selected with a representation color selection means, and a field division means will divide a color picture into two or more fields based on the selected representation color. And based on the size of the field obtained as a result of division, and the color difference with an adjoining field, it distinguishes whether recognition of image quality change is visually possible for each field with a field distinction means. Since the field which answers the distinction result of the field distinction means which shows that image quality change cannot be recognized visually, and corresponds with a field integrated means is unified with an adjoining field The thing resulting from random noise etc. which the field which cannot recognize image quality change remains independently visually can be prevented certainly, and it can divide into the subregion of a necessary minimum number. Moreover, since the field which cannot recognize image quality change is unified visually, there is no un-arranging [ that originate in field integration and image quality deteriorates ].

[0018] If it is the color picture art of claim 3, the representation color of a predetermined number will be selected based on a color picture. Based on the selected representation color, divide a color picture into two or more fields, and it answers that the pixel field where belonging to the boundary section of comparatively large fields to one field is permitted as a result of division exists. Since the pixel field which corresponds based on extensive \*\* of the comparatively large fields in the predetermined range is unified to which a comparatively large field Even if it originates in random noise etc. and the boundary of comparatively large fields has become tooth-like under the effect of the above-mentioned pixel field, by unifying concave heights to which comparatively large field, irregularity can be made to cancel and field division in the condition of having a simple boundary line can be attained. Therefore, while being able to reduce processing loads, such as color picture compression with high possibility of being carried out as after treatment, and color picture recognition, a processing duration can be shortened and, moreover, processing precision can be improved.

[0019] If it is the color picture processor of claim 4, based on a color picture, the representation color of a predetermined number will be selected with a representation color selection means, and a field division means will divide a color picture into two or more fields based on the selected representation color. And it distinguishes whether the pixel field where belonging to the boundary section of comparatively large fields to one field is permitted as a result of division exists with a pixel field distinction means. The distinction result of the pixel field distinction means which shows that the above-mentioned pixel field exists is answered. Since the pixel field which corresponds based on extensive \*\* of the comparatively large fields in the predetermined range with a pixel field integrated means is unified to which a comparatively large field Even if it originates in random noise etc. and the boundary of comparatively large fields has become tooth-like under the effect of the above-mentioned pixel field, by unifying concave heights to which comparatively large field, irregularity can be made to cancel and field division in the condition of having a simple boundary line can be attained. Therefore, while being able to reduce processing loads, such as color picture compression with high possibility of being carried out as after treatment, and color picture recognition, a processing duration can be shortened and, moreover, processing precision can be improved.



[0020] If it is the color picture art of claim 5, the representation color of a predetermined number will be selected based on a color picture. Based on the selected representation color, divide a color picture into two or more fields, and it answers that a long and slender field exists in the boundary section of comparatively large fields as a result of division. Since the long and slender field which corresponds based on the color difference of the corresponding long and slender field and a comparatively large field is unified to which a comparatively large field Even if the long and slender field where it originates in pin dotage etc. and the description value differs from any field among comparatively large fields is formed By unifying a long and slender field to which comparatively large field, comparatively large fields can be made to adjoin and field division in the condition with few fields can be attained. Therefore, while being able to reduce processing loads, such as color picture compression with high possibility of being carried out as after treatment, and color picture recognition, a processing duration can be shortened and, moreover, processing precision can be improved.

[0021] The color picture processor of claim 6 selects the representation color of a predetermined number based on a color picture with a representation color selection means, and divides a color picture into two or more fields with a field division means based on the selected representation color. The distinction result of the Sai chief field distinction means which shows that a long and slender field exists is answered. and a \*\*\*\*\* [ that a long and slender field exists in the boundary section of comparatively large fields as a result of division ] -- the Sai chief field distinction means -- distinguishing -- the above -- Since the long and slender field which corresponds with the Sai chief field integrated means based on the color difference of the corresponding long and slender field and a comparatively large field is unified to which a comparatively large field Even if the long and slender field where it originates in pin dotage etc. and the description value differs from any field among comparatively large fields is formed By unifying a long and slender field to which comparatively large field, comparatively large fields can be made to adjoin and field division in the condition with few fields can be attained. Therefore, while being able to reduce processing loads, such as color picture compression with high possibility of being carried out as after treatment, and color picture recognition, a processing duration can be shortened and, moreover, processing precision can be improved.

[0022]

[Example] Hereafter, the accompanying drawing which shows an example explains to a detail. Drawing 1 is a flow chart explaining one example of the color picture art of this invention. Incorporate the color picture which serves as a processing object in a step SP 1, and two or more representation colors (it is a color with the high frequency of occurrence in a color picture) are elected in a step SP 2. It permutes in the representation color which can approximate most the color which was not elected as a representation color in a step SP 3, and a partial image field is obtained for every representation color in a step SP 4. Subsequently, it distinguishes whether the partial image field which cannot identify image quality change visually in a step SP 5 exists, and when the partial image field which cannot identify image quality change visually exists, the partial image field which cannot identify image quality change visually in a step SP 6 is unified with which partial image field, and a step SP 5 is distinguished again. When the partial image field which cannot identify image quality change visually in the above-mentioned step SP 5 did not exist and it is distinguished, in a step SP 7, each partial image field is approximated with a polygon, and a series of processings are ended.

[0023] About the color which elected the chromaticity value applicable to order with the high frequency of occurrence as a representation color, and was not elected as a representation color about processing of the above-mentioned steps SP2 and SP3, for example after changing the color data (for example, RGB data) of a processing-object color picture into chromaticity data (for example,  $L^*a^*b^*$  data), it permutes with the chromaticity value of a representation color with the shortest distance on a chromaticity diagram.

[0024] Distinction of the above-mentioned step SP 5 is performed based on the size of the partial image field used as the color difference between adjoining partial image fields, and a processing object. When various partial image fields are specifically unified and removed to other partial image fields where the color difference is the smallest, as a whole, the discernment impossible field shown in drawing 2 based on whether image quality change has identified visually is created, and it is distinguished based on whether it belongs to the discernment impossible field shown in drawing 2. In addition, in drawing 2, an axis of abscissa is area size (the number of pixel number x pixels), and an axis of ordinate is color difference  $\Delta E_{ab}$  (for example, 1/10 of values of the color difference value of the 1976  $L^*a^*b^*$  color coordinate system of CIE) with an adjoining partial image field. When the approximation of function of the boundary line which specifies the above-mentioned discernment impossible field is carried out and area size is six or less It is  $\Delta E_{ab} = \infty$ . When area size is larger than 6 Since the sequence of points from which  $\Delta E_{ab}$  is set to 93, 83, 70, 62, 58, 52, 50, 44, 36, and 36 by area size corresponding to each of 7, 10, 20, 30, 40, 50, and 60, 100, 200, 500 correspond based on the discernment result by many test subjects It can approximate with a function called  $Y=64$  and

$\exp(-0.026X)+36$ . However, X is area size and Y is the value of  $\Delta E_{ab}$ .

[0025] By performing a series of above processings, visually, it unifies to which field (it is specifically the field where the color difference is the smallest) resulting from random noise etc. which adjoins the field which cannot identify image quality change, and the number of the partial image fields finally obtained can be reduced sharply.

[0026]

[Example 2] Drawing 3 is the block diagram showing one example of the color picture processor of this invention. The color picture incorporation section 1, The representation colour selection section 2 as which the frequency of occurrence chooses two or more high colors as a representation color based on the incorporated color picture, The permutation section 3 which permutes the color which was not chosen as a representation color in the representation color which can be approximated most, The image division section 4 which obtains a partial image field for every representation color based on the permutation result by the permutation section 3, The field distinction section 5 which distinguishes whether it is the field which can identify image quality change visually about each partial image field obtained by the image division section 4, It has the field integrated section 6 which answers the distinction result of the field distinction section 5 which shows that image quality change is not visually discriminable, and unifies the corresponding field with the adjoining field where the color difference is the smallest among adjoining fields. In addition, since the operation of each part of a configuration is the same as that of processing of a step in which the flow chart of drawing 1 corresponds, detailed explanation is omitted.

[0027] Therefore, by adopting the color picture processor of drawing 3, the adjoining color difference resulting from random noise etc. unifies visually the field which cannot identify image quality change to the smallest field, and the number of the partial image fields finally obtained can be reduced sharply.

[0028]

[Example 3] Drawing 4 is a flow chart explaining other examples of the color picture art of this invention, and is set to a step SP 1. Choose a pixel from the images of the result to which field division was carried out by the block diagram, other conventionally well-known approaches, or equipment of the flow chart of drawing 1, and drawing 3, and it sets to a step SP 2. Set up the rectangle field (for example, L pixel x L pixel field) centering on the selected pixel, and it sets to a step SP 3. Extract the field which occupies the largest area all over the rectangle field, and it sets to a step SP 4. When it did not belong to the field to which it distinguished and the selected pixel was extracted and is distinguished, whether it belongs to the field to which the selected pixel was extracted In a step SP 5, the color difference of the selected pixel and the extracted field distinguishes whether it is below a predetermined threshold (for example, about 2 times of the threshold set up when performing field division). and when the color difference of the selected pixel and the extracted field is distinguished as it is below a predetermined threshold It unifies to the field from which the selected pixel was extracted in a step SP 6. When it distinguished whether processing was performed about all pixels in a step SP 7, and the pixel to which processing is not performed existed and it is distinguished, the following pixel is chosen in a step SP 8, and processing of a step SP 2 is repeated again. Moreover, when it belonged to the field to which the pixel chosen in the above-mentioned step SP 4 was extracted, it was distinguished, the color difference of the pixel chosen in a step SP 5 and the extracted field exceeded the predetermined threshold and it is distinguished, a step SP 7 is distinguished as it is. That is, integrated processing is not performed in this case. Moreover, when it is distinguished that processing was performed about all pixels in a step SP 7, a series of processings are ended as they are.

[0029] When drawing 5 is a schematic diagram explaining pixel field integrated processing and the pixel shown by P1 has become drawing 5 (A) with the processing object The L pixel x L pixel field centering on this pixel P1 is set up, and since the field R1 is the largest in this field, a pixel P1 is unified by the field R1 a condition [ the color difference of a pixel P1 and a field R1 being below a threshold ] (refer to drawing 5 (B)). Hereafter, by repeating the same processing, as shown in drawing 5 (C), the boundary line of a field R1 and a field R2 changes from irregularity to a straight line. That is, the configuration of both the fields R1 and R2 can be simplified.

[0030]

[Example 4] The pixel extract section 11 which extracts one pixel from the color picture to which drawing 6 is the block diagram showing other examples of the color picture processor of this invention, and field division processing was performed as a processing-object pixel, The rectangle field setting section 12 which sets up the rectangle field centering on the extracted pixel, The field extract section 13 which extracts the field where area is the largest all over the set-up rectangle field, The pixel distinction section 14 which distinguishes whether it belongs to the field to which the extracted pixel was extracted, The distinction result of the pixel distinction section 14 which shows not belonging to the field to which the extracted pixel was extracted is answered. The color difference calculation section 15 which computes the color difference of the extracted pixel and the extracted field, The color difference distinction section 16 which distinguishes whether the computed color difference is below a predetermined threshold, The distinction result



of the pixel distinction section 14 which shows not belonging to the field to which the extracted pixel was extracted, and the distinction result of the color difference distinction section 16 which shows that the computed color difference is below a predetermined threshold are answered. It has the pixel integrated section 17 unified to the field from which the extracted pixel was extracted, and the repetitive control section 18 which makes processing by above-mentioned each part of a configuration repeat about all the pixels contained in a color picture.

[0031] In addition, since the operation of each part of a configuration is the same as that of processing of a step in which the flow chart of drawing 4 corresponds, detailed explanation is omitted. Therefore, by adopting the color picture processor of drawing 6, the boundary line of an adjoining field changes from irregularity to a straight line, and can simplify the configuration of both fields.

[0032]

[Example 5] Drawing 7 is a flow chart explaining the example of further others of the color picture art of this invention, and is set to a step SP 1. The Sai chief field whose width of face is 1 pixel is extracted in the direction which intersects perpendicularly with a scanning direction or a scanning direction out of the image of the result to which field division was carried out by the block diagram, other conventionally well-known approaches, or equipment of the flow chart of drawing 1, and drawing 3. In being the direction where the sense of the Sai chief field is distinguished in a step SP 2, and a scanning direction and the sense of the Sai chief field cross at right angles In a step SP 3, the color difference with the pixel of order is computed about a scanning direction, and the processing-object pixel of the Sai chief field is unified to the field to which a pixel with the small color difference belongs in a step SP 4. On the contrary, when it is distinguished that the sense of the Sai chief field is a scanning direction in a step SP 2, the color difference with the pixel of order is computed about the direction which intersects perpendicularly with a scanning direction in a step SP 5, and the processing-object pixel of the Sai chief field is unified to the field to which a pixel with the small color difference belongs in a step SP 6. The following pixel which belongs to the Sai chief field in a step SP 8 is chosen, and a step SP 2 is again distinguished until all the pixels belonging to the Sai chief field are distinguished in a step SP 7 as processing was performed, after processing of a step SP 4 or a step SP 6 is performed. When the Sai chief field where it distinguishes whether processing was performed about all the Sai chief fields in a step SP 9 when it was distinguished that processing was performed about all the pixels that belong to the Sai chief field in a step SP 7, and processing is not performed exists, other Sai chief fields are extracted in a step SP 10, and a step SP 2 is distinguished again. When it is distinguished that processing was performed about all the Sai chief fields in a step SP 9, a series of processings are ended as they are.

[0033] Drawing 8 is drawing showing integrated processing of the Sai chief field roughly, and the fields r1, r2, r3, and r4 shown in drawing 8 (A) and (B) are extracted as a Sai chief field. Since drawing 8 (C) and (D) show integrated processing when a field r1 is extracted and assume that the color difference with a left pixel is small in drawing, the pixel belonging to the Sai chief field is unified by the left-hand side field {refer to drawing 8 (D)}.

[0034] Even if the Sai chief field remains by causes, like the color difference is over a predetermined threshold even if it performs processing which follows, for example, is shown in drawing 4 and unifies a pixel field, by performing processing shown in drawing 7, the color difference can unify the Sai chief field to the field of a small side, and the boundary of partial image fields can be simplified, as a result the configuration of each partial image field can be simplified. Of course, it can apply similarly to the color picture which the Sai chief field resulting from pin dotage etc. generated, and the same effectiveness can be attained.

[0035]

[Example 6] The Sai chief field extract section 21 which extracts one Sai chief field from the color picture to which drawing 9 is the block diagram showing the example of further others of the color picture processor of this invention, and field division processing was performed as a \*\*\*\*\* length field, The color difference calculation section 23 which computes the color difference of a \*\*\*\*\* pixel and the pixel which belongs to the Sai chief field in the sense detecting element 22 which detects the sense of the extracted Sai chief field, and the direction which intersects perpendicularly with the detected sense, It has the Sai chief field integrated section 24 which unifies the Sai chief field to the field where a pixel with the computed large color difference belongs, and the repetitive control section 25 which makes processing by above-mentioned each part of a configuration repeat about all the Sai chief fields included in a color picture.

[0036] In addition, since the operation of each part of a configuration is the same as that of processing of a step in which the flow chart of drawing 7 corresponds, detailed explanation is omitted. Therefore, by adopting the color picture processor of drawing 9, the color difference can unify the Sai chief field to the field of a small side, and the boundary of partial image fields can be simplified, as a result the configuration of each partial image field can be simplified.

[0037] In addition, it is not limited to the above-mentioned example and this invention can set up the larger pixel field

as a processing-object pixel field [ in / examples 3 and 4 ] than 1 pixel, and also can set up the field of the width of face which exceeds 1 pixel as a Sai chief field in examples 5 and 6, in addition can perform various design changes within limits which do not change the summary of this invention.

[0038]

[Effect of the Invention] As mentioned above, invention of claim 1 prevents certainly the thing resulting from random noise etc. which the field which cannot recognize image quality change remains independently visually, can divide it into the subregion of a necessary minimum number, and does so the characteristic effectiveness that degradation of the image quality which moreover originates in field integration can be prevented certainly.

[0039] Invention of claim 2 also prevents certainly the thing resulting from random noise etc. which the field which cannot recognize image quality change remains independently visually, can divide it into the subregion of a necessary minimum number, and does so the characteristic effectiveness that degradation of the image quality which moreover originates in field integration can be prevented certainly. Even if it originates in random noise etc. and the boundary of comparatively large fields has become tooth-like under the effect of the above-mentioned pixel field, invention of claim 3 If field division in the condition of having a simple boundary line by unifying concave heights to which comparatively large field, and making irregularity canceling can be attained and it pulls While being able to reduce processing loads, such as color picture compression with high possibility of being carried out as after treatment, and color picture recognition, a processing duration can be shortened and the characteristic effectiveness that processing precision can moreover be improved is done so.

[0040] Even if it originates in random noise etc. and the boundary of comparatively large fields has become tooth-like under the effect of the above-mentioned pixel field, invention of claim 4 If field division in the condition of having a simple boundary line by unifying concave heights to which comparatively large field, and making irregularity canceling can be attained and it pulls While being able to reduce processing loads, such as color picture compression with high possibility of being carried out as after treatment, and color picture recognition, a processing duration can be shortened and the characteristic effectiveness that processing precision can moreover be improved is done so.

[0041] Even if the long and slender field where it originates in pin dotage etc. and the description value differs from any field among comparatively large fields is formed, invention of claim 5 If the number of fields can attain field division in few condition and pulls by unifying a long and slender field to which comparatively large field, and making comparatively large fields adjoin While being able to reduce processing loads, such as color picture compression with high possibility of being carried out as after treatment, and color picture recognition, a processing duration can be shortened and the characteristic effectiveness that processing precision can moreover be improved is done so.

[0042] Even if the long and slender field where invention of claim 6 also originates in pin dotage etc., and the description value differs from any field among comparatively large fields is formed If the number of fields can attain field division in few condition and pulls by unifying a long and slender field to which comparatively large field, and making comparatively large fields adjoin While being able to reduce processing loads, such as color picture compression with high possibility of being carried out as after treatment, and color picture recognition, a processing duration can be shortened and the characteristic effectiveness that processing precision can moreover be improved is done so.

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[Translation done.]

**\*NOTICES \***

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] It is a flow chart explaining one example of the color picture art of this invention.

[Drawing 2] It is drawing showing a discernment impossible field.

[Drawing 3] It is the block diagram showing one example of the color picture processor of this invention.

[Drawing 4] It is a flow chart explaining other examples of the color picture art of this invention.

[Drawing 5] It is a schematic diagram explaining pixel field integrated processing.

[Drawing 6] It is the block diagram showing other examples of the color picture processor of this invention.

[Drawing 7] It is a flow chart explaining the example of further others of the color picture art of this invention.

[Drawing 8] It is drawing showing integrated processing of a \*\*\*\* field roughly.

[Drawing 9] It is the block diagram showing the example of further others of the color picture processor of this invention.

[Drawing 10] It is drawing which explains roughly un-arranging [ which is depended comparatively ] by the conventional image.

[Description of Notations]

2 Representation Colour Selection Section 4 Image Division Section 5 Field Distinction Section 6 Field Integrated Section

14 Pixel Distinction Section 15 Coloring Matter Calculation Section 16 Coloring Matter Distinction Section

17 Pixel Integrated Section 21 Sai Chief Field Extract Section

22 Sense Detecting Element 23 Color Difference Calculation Section

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[Translation done.]

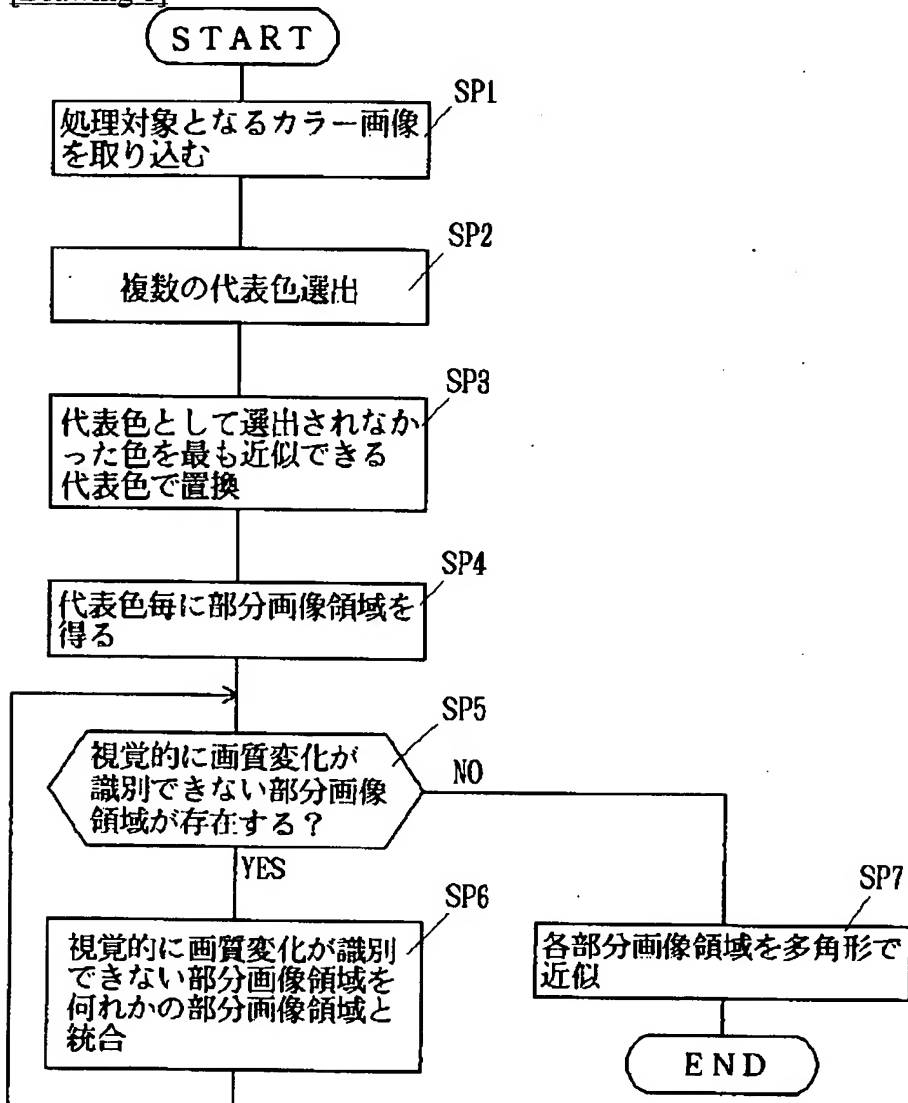
## \*NOTICES\*

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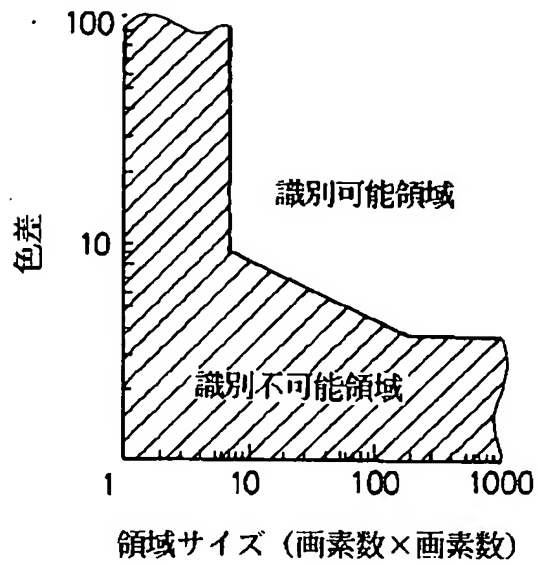
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DRAWINGS

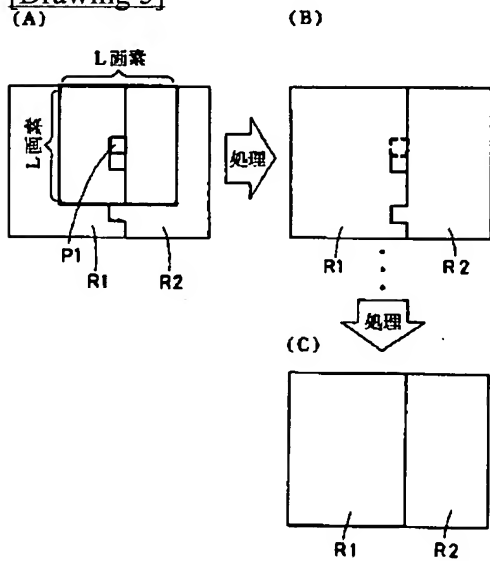
[Drawing 1]



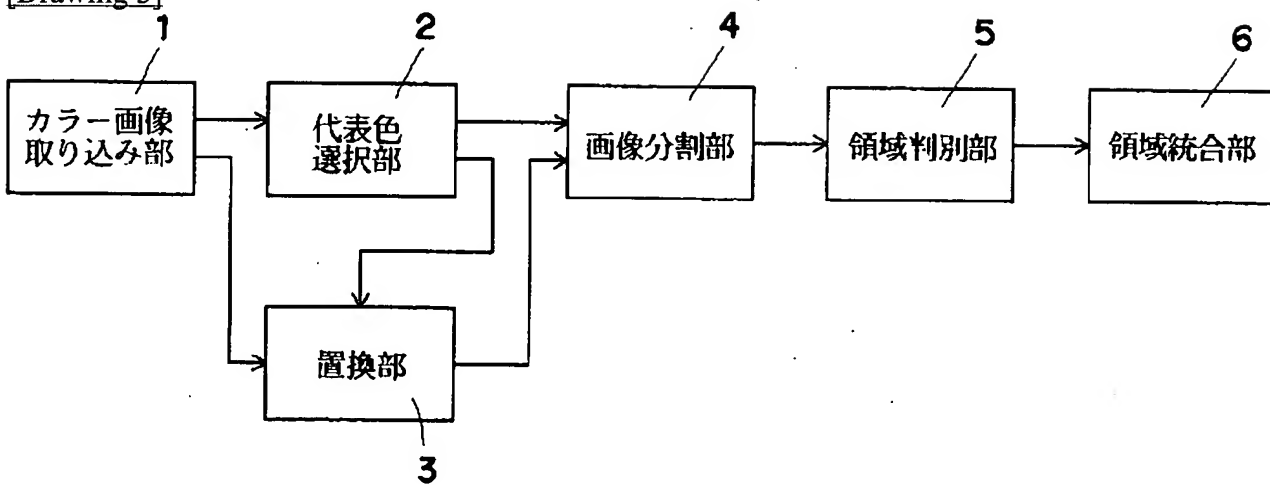
[Drawing 2]



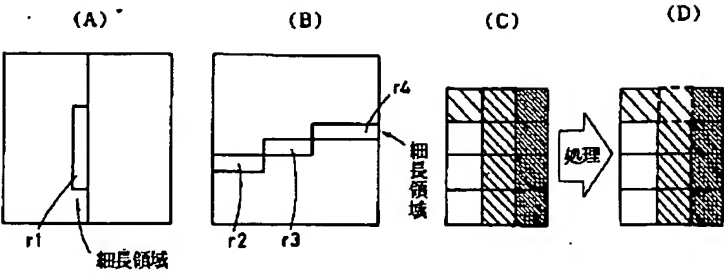
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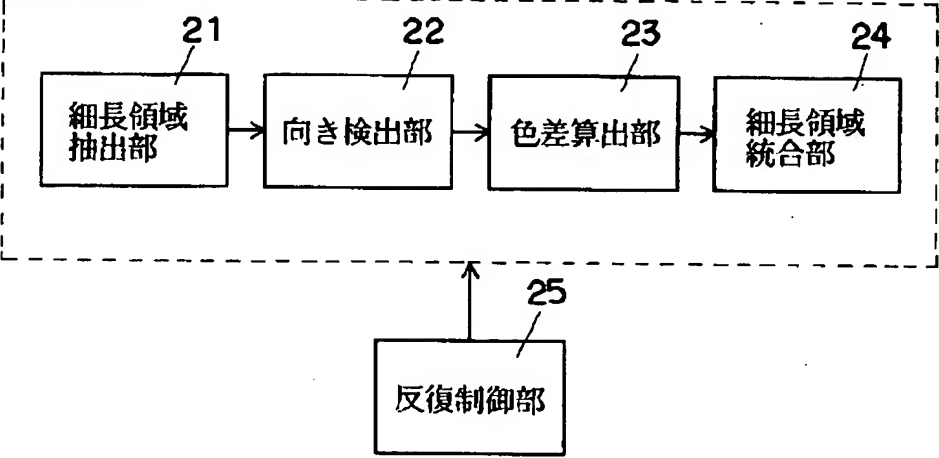
[Drawing 3]



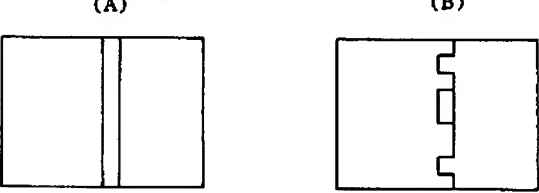
[Drawing 8]



[Drawing 9]

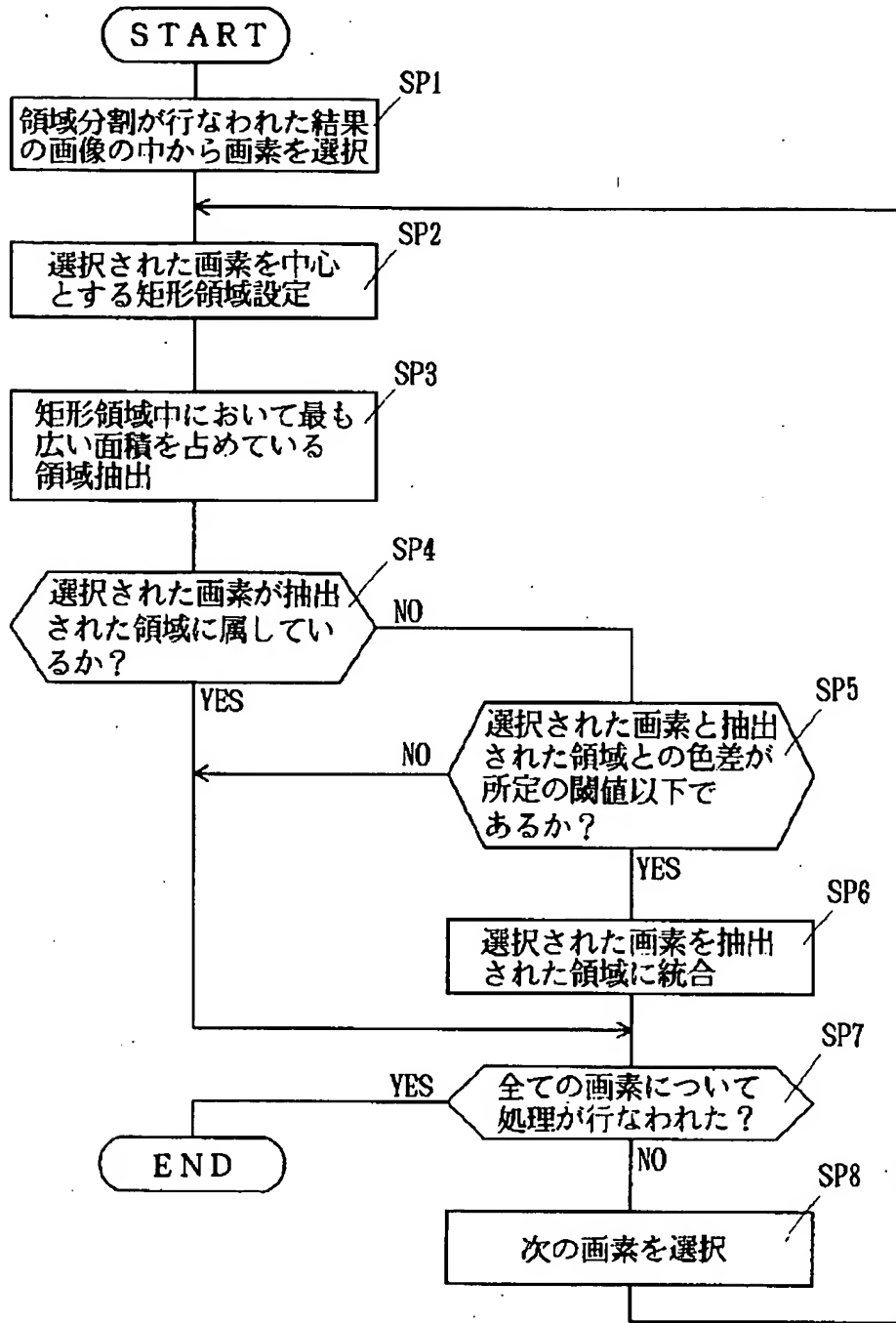


[Drawing 10]

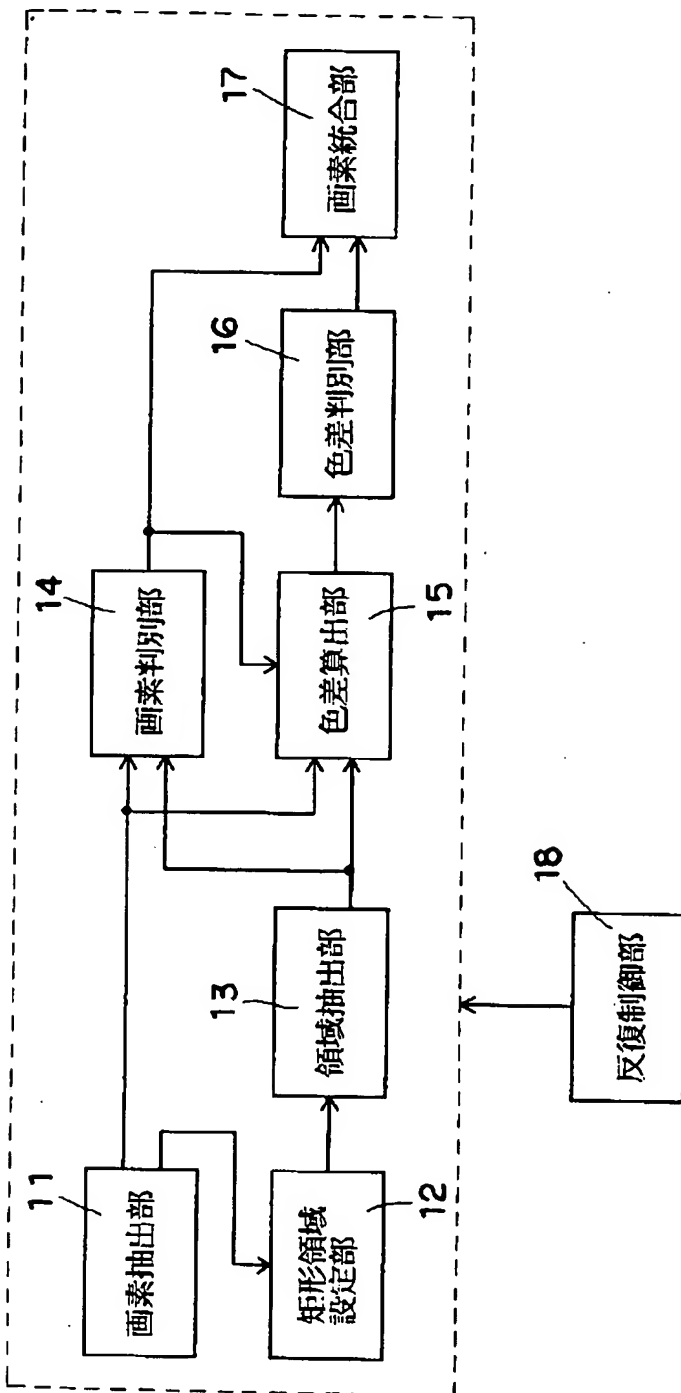


[Drawing 4]

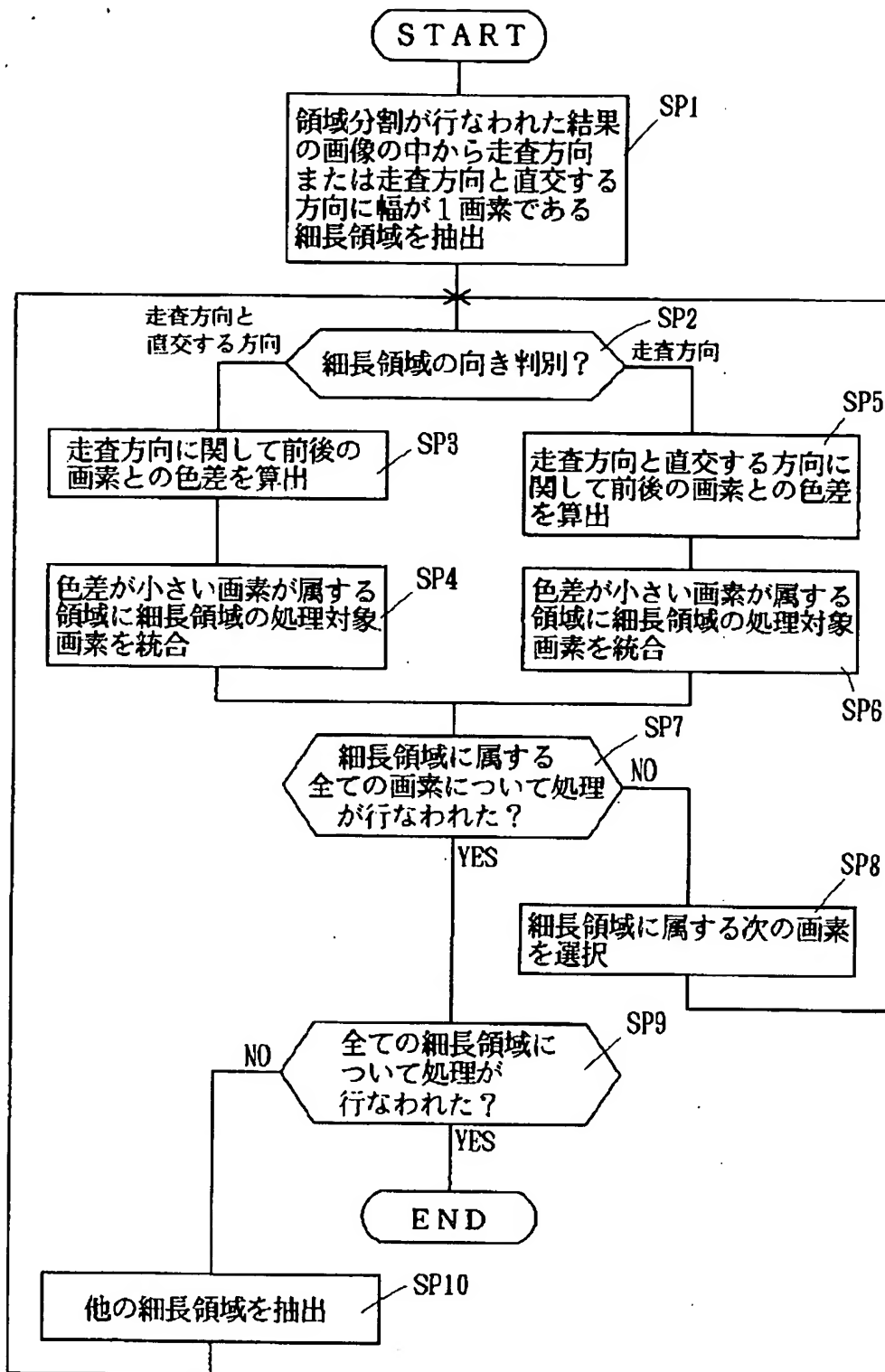




[Drawing 6]



[Drawing 7]



[Translation done.]